

N 8 9 - 2 6 3 4 0

56-91
NBS 5114
198673
18

Rationale For A Mars Rover/Sample Return Mission

Michael H. Carr
U.S. Geological Survey GU 71788C
Menlo Park, CA 94025

A Mars Rover/Sample Return mission is currently being studied for the late 1990's. The objectives of the mission are to better understand the origin and evolution of Mars, to search for evidence of former life, and to improve our knowledge of the Martian environment in preparation for subsequent human exploration. Among the planets, Mars has long been of special interest because of the possibility that life might have started there, and because of the certainty that it will be the first planet to be visited by humans. Having formed in a different part of the Solar System from Earth, Mars will provide clues that will better enable us to discriminate between conflicting theories of Solar System formation. Mars is also a natural laboratory on which a wide range of geologic and meteorological processes have operated under conditions very different from those on Earth. Samples are needed so that the full range of analytical techniques available here on Earth can be applied to the study of these issues. The rover provides the mobility needed to access different materials, and can be equipped with an analytical capability so that the planet can be sampled intelligently. The rover will also provide the means of exploring the planet on a human scale and performing a wide range of *in situ* measurements at different locations. Different mission scenarios are currently being studied with the goal of achieving sample return before the end of the century.